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## Monitoring a pulse in adults

Jaden Allan, Senior Lecturer in Adult Nursing, Northumbria University (jaden.allan@northumbria.ac.uk) and Karen Sheppard, Sister, Critical Care, Royal Victoria Infirmary, Newcastle upon Tyne Hospitals NHS Foundation Trust, provide a how-to guide on taking a pulse in adult patients.

## LEARNING OUTCOMES

Understand the rationale for taking a pulse as a fundamental aspect of nursing care

Know the most common anatomical positions for measuring the pulse rate

Understand the importance of developing an accurate technique

Know what are normal and abnormal pulse rates and patterns for adults

When nursing patients in clinical practice, registered nurses (RNs) must use their nursing expertise and critical thinking skills (Nursing and Midwifery Council (NMC), 2015). This is achieved through the use of the nursing process. The nursing process is a five-step framework (Stonehouse, 2017) comprising:

Assessment

Diagnosis

Planning

Implementing

Evaluation.

During the assessment stage, RNs will collect clinical patient data to establish a patient's physiological benchmark (their normal observations). Patient assessment includes the measurement of four primary vital signs:

Body temperature

Heart rate/pulse

Respiration rate

Blood pressure.

These vital signs indicate the status of the body's life-sustaining functions. These measurements are taken to help assess the general physical health of a person, give clues to possible diseases, and show progress towards recovery. The normal ranges for a person's vital signs vary with age, weight, sex, and overall health. It is also important that experienced RNs pass on their knowledge and skills to the next generations of students so they have the assessment skills required to ensure safe, effective care (NMC, 2015; NMC, 2018a; 2018b).

## Pulse monitoring

Pulse monitoring is an integral component and vital sign of a patient's cardiovascular health. The Royal College of Nursing (RCN) states that the terms 'pulse' and 'heart rate' are used interchangeably in the clinical setting (RCN, 2017). Additionally, in 2017, the Royal College of Physicians (RCP) (2017) used the word 'pulse' on its updated National Early Warning Score 2 (NEWS 2) chart (RCP, 2017). Therefore, 'pulse' will be used in this article.

Pulse is the measurement of the heart beat that pushes blood through the arteries. According to Waugh and Grant (2018) a patient's pulse is usually monitored where an artery can be occluded against a solid mass such as bone. Ideally, the pulse should be measured at the wrist (radial artery) (see *Figure 1*) or elbow (brachial artery).

Temporal artery

Brachial

Popliteal artery

Carotid

Apical pulse

Radial

Femoral

Posterior tibial artery

Pedal

Figure 1. Circulatory system and pulse sites

The pulse is usually taken at the radial artery because of ease of access and blood pressure is usually taken at the brachial artery. RNs are required to be able to measure the pulse accurately as part of taking a patient's vital signs (NMC) (2015; 2018a). *Table 1* gives adult pulse ranges.

Beats per minute (bpm) Pulse term Average pulse

60–100 Normal range at rest 80

Below <60 Bradycardia

Above >100 Tachycardia

## Taking a pulse

Before taking a patient's pulse, nurses should observe a patient's overall presentation: do they look red, hot and sweaty, well perfused, or pale and clammy? A combination of observation skills will support the nurse in identifying a patient's altered health state. The pulse can be affected by many factors, including anxiety and exercise. Remember that the pulse is a measurement of the heartbeat—if someone is anxious or has been exercising (perhaps rushing to get to a hospital appointment, or has just walked back from another room) their heartbeat will usually increase to ensure their body has enough oxygen circulating to meet the requirements of exercise or the 'flight or fight' response. When approaching all patients to take a pulse, and particularly a patient with a visual or hearing deficit, it is important that the nurse explains what they are doing, so as not to cause surprise or anxiety, which might alter the results. *Table 2* provides common physiological factors that affect the pulse rate.

Age Ageing affects the metabolic rate and thus can reduce the pulse rate

Sex Pulse rates in females are normally slightly higher than in males

Exercise Exercise will normally increase the heart rate to ensure good oxygen supply, thus the pulse increases

Temperature (pyrexia/  
hypothermia)

With high temperatures (pyrexia) the pulse rate will increase to assist with homeostasis; with low temperatures (hypothermia) the pulse rate will decrease as the body's metabolism slows down

Low blood volume  
(hypovolaemia)

The pulse rate will increase to compensate for low blood volume to ensure circulation and blood pressure is maintained

Anxiety, stress, pain, surprise

These factors affect the cardiac system and thus the heart rate increases, resulting in higher pulse rates

Body position Standing and sitting will affect the circulatory system and impact on the heart rate. Normally, when patients sit up or stand, gravity directs some of the blood down to the abdominal area, hands and feet. In response, patients' blood vessels narrow and their heart rate increases slightly to maintain blood flow to the heart and brain, and to prevent blood pressure dropping. This is done automatically, and is controlled by the autonomic nervous system, which controls automatic body functions. Conditions such as postural tachycardia syndrome can cause symptoms such as dizziness, lightheadedness and fainting

Medication Some medications can affect the heart rate. Sympathomimetics, which affect the sympathetic nervous system, and treatments for respiratory conditions, including asthma, such as salbutamol and terbutaline sulfate, may increase the pulse rate

Beta blockers, such as metoprolol and digoxin, have the opposite effect and reduce heart rate and thus pulse rate

It is important to know the side effects and contraindications to medications prescribed

Student nurses can be encouraged to make a list of the top five medications used in their clinical placements, including the normal dose, side effects and contraindications

Pre-existing conditions Chronic obstructive pulmonary disease, peripheral vascular disease, and heart failure are a few of the conditions that affect the circulatory system for various reasons, thus affecting the pulse. It is always important that nurses know their patient and their normal pulse range

Source: adapted from: Alexis, 2010; Douglas et al, 2013; Dougherty and Lister, 2015; NHS website, 2018; Waugh and Grant, 2018

## Consent

RNs should always obtain consent where possible. They should ensure that the patient fully understands what is required to measure the pulse, including what the pulse is and where it will be taken. The RN should ensure there are no physiological barriers at the pulse site, such as restricted blood flow or injury. If nurses are unsure they should consult a senior colleague.

## Palpating a pulse

RNs should follow infection control procedures, including observing handhygiene requirements and using personal protective equipment if required. The first, second and third fingers should be used to gently press on the radial artery just below the wrist (see *Figure 2*). Pressure must be firm enough to restrict the blood flow through the artery, which will allow the RN to feel the 'pulse' of the blood. It should be noted that using the first and second finger is also satisfactory. The thumb should not be used as it has its own pulse beat. To take a brachial artery pulse, the same fingers should be used to press on the brachial artery at the elbow (see *Figure 3*).

The patient should be asked to keep their arm straight, as this will help the nurse to palpate the artery. Ensure the patient does not have restricted movement in their arm or any other existing condition that might impact on joint movement. To maintain a consistent approach, it is good practice to take repeated pulse measurements from the same anatomical site. When palpating a pulse, the force of the applied pressure may cause an obstruction, meaning that no palpable pulse will be found. The nurse should reduce the pressure applied so that the pulse can be felt. This is a skill that takes practice. Once the RN has found the pulse, it should be measured for a clear, full minute. This ensures that an accurate measurement of the rate (bpm), rhythm (regular or irregular) and amplitude (strength of the pulse) is gained. *Box 1* provides tips on taking a pulse in a tachycardic patient.

### Box 1.

It is usually easy to count low or average pulse rates by timing against a watch. Students can practise by taking their own or a colleague's pulse at different pulse points. It is important to practise counting tachycardic rates. An online metronome can be used to practise this. Pulse rates can be counted in blocks, using one hand with fingers extended to track how many blocks are reached. For example, count in blocks of 25 and when each 25 is reached, bend one finger down. At the end of one minute, the number of retracted fingers and the final number block can be added to give a pulse total. Students new to measuring pulse rates may find it difficult to count tachycardic rates while watching the time for one minute. They can practise by starting on the hour, at a quarter past, or half past on analogue watches, or using a timer on digital watches.

## Recording

Details should be recorded on the appropriate chart or NEWS 2 (NMC, 2015; 2018a; 2018b) and any changes, irregularity of rhythm or a weak or bounding pulse should be reported. Taking a pulse at the radial site should be reported. Such results may be normal for some patients but any abnormalities or concerns should be reported immediately to the health professional responsible for the patient's care. Finally, RNs should ensure they thank the patient and answer any questions they may have about the observation and data collected.

## Conclusion

Recording a patient's pulse is one of the fundamental skills that an RN must master. Nurses have a responsibility and a duty of care to undertake such skills in a competent, professional manner and to include patients in their own care provision, providing education and reassurance about their condition and treatment.

Place your three fingers as indicated. Note the landmarks of the tendons, and natural indentation. Gently extend the elbow upwards

Figure 3. Taking a pulse at the brachial site

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